

WHAT IS CLAIMED IS:

1. An exposure apparatus for exposing a substrate to a pattern drawn on a master surface, comprising a driving unit for moving master and substrate stages or
5 a linear motor for generating a control power for cutting off transmission of a reaction force and/or an external vibration to the exposure apparatus in driving the stages,

wherein said linear motor has a coil formed by
10 winding a foil-like conductor having an insulating layer in a multilayered structure.

2. An exposure apparatus for exposing a substrate to a pattern drawn on a master surface, comprising a driving unit for moving master and substrate stages or
15 a linear motor for generating a control power for cutting off transmission of a reaction force and/or an external vibration to the exposure apparatus in driving the stages,

wherein said linear motor has:

- 20 a coil formed by winding a foil-like conductor in a multilayered structure via an insulating layer; and
a lead line for connecting an inner or outer end of the coil to an external electrode.

3. The apparatus according to claim 2, wherein at
25 least part of the lead line includes the foil-like conductor which forms the coil.

4. The apparatus according to claim 2, wherein the

lead line connected to the inner end of the coil is extracted in an outer circumferential direction of the coil, and has an insulating material for insulating the lead line and a coil main body from each other.

- 5 5. An exposure apparatus for exposing a substrate to a pattern drawn on a master surface, comprising a driving unit for moving master and substrate stages or a linear motor for generating a control power for cutting off transmission of a reaction force and/or an external vibration to the exposure apparatus in driving the stages,

wherein said linear motor has:

- a coil formed by winding a foil-like conductor in a multilayered structure via an insulating layer; and
15 a relay substrate for connecting an inner or outer end of the coil to an external electrode.

6. The apparatus according to claim 5, wherein the relay substrate has a function of relaying a lead line connected to the inner or outer end of the coil, and a
20 terminal for connecting an electrode of the coil to the external electrode.

7. The apparatus according to claim 5, wherein the relay substrate is disposed at a portion in an inner or outer circumferential surface direction of the coil or
25 in a side surface direction in contact with edges of inner and outer circumferential surfaces.

8. The apparatus according to claim 5, wherein the

relay substrate includes a substrate bearing another conductor wire or conductor pattern, or a flexible substrate.

9. An exposure apparatus for exposing a substrate to
5 a pattern drawn on a master surface, comprising a driving unit for moving master and substrate stages or a linear motor for generating a control power for cutting off transmission of a reaction force and/or an external vibration to the exposure apparatus in driving
10 the stages,

wherein said linear motor has a seamlessly continuous coil formed from a plurality of partial coils prepared by winding a foil-like conductor in a multilayered structure via an insulating layer so as to
15 make current application/rotation directions coincide with each other.

10. The apparatus according to claim 9, wherein the coil is constituted by spacing apart or stacking the plurality of partial coils in a gap direction of a
20 magnetic circuit.

11. The apparatus according to claim 9, wherein the coil is made continuous by spirally bending the foil-like conductor between two different partial coils.

12. The apparatus according to claim 9, wherein the
25 respective partial coils are made continuous by bending twice the foil-like conductor between two different partial coils at a substantially right angle.

13. The apparatus according to claim 9, wherein the coil has a structure in which the foil-like conductor is continuously wound spirally or by bending the foil-like conductor a plurality of number of times
5 between two juxtaposed partial coils.

14. An exposure apparatus for exposing a substrate to a pattern drawn on a master surface, comprising a driving unit for moving master and substrate stages or a linear motor for generating a control power for
10 cutting off transmission of a reaction force and/or an external vibration to the exposure apparatus in driving the stages,

wherein said linear motor has a coil which is formed by winding a foil-like conductor in a
15 multilayered structure via an insulating layer and has a through hole.

15. The apparatus according to claim 14, wherein a wall surface of the hole is insulated.

16. The apparatus according to claim 1, wherein a
20 member for forming the insulating layer is formed from a flexible insulating sheet of a polymer material, an insulating film, an insulating coat, or an oxide film of a conductor metal which forms the foil-like conductor.

25 17. The apparatus according to claim 16, wherein the insulating film includes an insulating base film using a paraffin-based fully aromatic polyamide fiber or

resin.

18. The apparatus according to claim 1, wherein the insulating layer is adhered to one or two sides of the foil-like conductor.

5 19. The apparatus according to claim 1, wherein a conductor-side end or corner of the coil in a direction of width is oxidized.

20. The apparatus according to claim 1, wherein the foil-like conductor includes at least one metal
10 selected from the group consisting of copper, aluminum, a copper-aluminum alloy, silver, gold, a ferrite alloy, an Ni alloy, and a permalloy.

21. The apparatus according to claim 1, wherein the insulating layer has a width larger than that of the
15 foil-like conductor.

22. The apparatus according to claim 1, wherein the foil-like conductor is formed from a cladding member with a multilayered structure formed by conductors of different materials.

20 23. The apparatus according to claim 22, wherein the cladding member uses a conductor material as a high-permeability material.

24. The apparatus according to claim 1, wherein a high-permeability material is used as a material for
25 forming the coil.

25. The apparatus according to claim 1, wherein said linear motor comprises a plurality of coils which are

so aligned as to make outer circumferential surfaces of adjacent coils face each other.

26. The apparatus according to claim 1, wherein said linear motor includes a stationary member having the
5 coil and a movable member having a magnet.

27. The apparatus according to claim 1, wherein said linear motor has a structure in which a member for forming the insulating layer is adhered between a coil
10 the coil or adhered to an inner circumferential surface, outer circumferential surface, or side surface of the coil main body.

28. The apparatus according to claim 1, wherein said linear motor drives a stage apparatus which supports
15 the master or substrate.

29. The apparatus according to claim 1, wherein said linear motor transmits a reaction force from a stage apparatus which supports the master or substrate.

30. The apparatus according to claim 1, wherein said
20 linear motor is used as damping means for a main body structure which supports a projection optical system and a stage apparatus that supports the master or substrate.

31. The apparatus according to claim 1, wherein the
25 exposure includes projection exposure for projecting the pattern of the master onto the substrate by an electron beam via a projection optical system.

32. The apparatus according to claim 27, wherein the stage apparatus relatively moves both the master and substrate or only the substrate with respect to an exposure optical axis in order to repetitively expose the substrate to the pattern of the master.

33. A semiconductor device manufacturing method comprising the steps of:

installing a plurality of semiconductor manufacturing apparatuses including an exposure apparatus in a semiconductor manufacturing factory; and manufacturing a semiconductor device by using the plurality of semiconductor manufacturing apparatuses, wherein the exposure apparatus includes a driving unit for moving master and substrate stages or a linear motor for generating a control power for cutting off transmission of a reaction force and/or an external vibration to the exposure apparatus in driving the stages, and

the linear motor has a coil formed by winding a foil-like conductor having an insulating layer in a multilayered structure.

34. The method according to claim 33, further comprising the steps of:

connecting the plurality of semiconductor manufacturing apparatuses via a local area network;

connecting the local area network to an external network outside the semiconductor manufacturing

factory;

acquiring information about the exposure apparatus from a database on the external network by using the local area network and the external network;

5 and

controlling the exposure apparatus on the basis of the acquired information.

35. The method according to claim 33, wherein a database provided by a vendor or user of the exposure apparatus is accessed via the external network, thereby obtaining maintenance information of the manufacturing apparatus by data communication, or data communication is performed between the semiconductor manufacturing factory and another semiconductor manufacturing factory via the external network, thereby performing production management.

36. A semiconductor manufacturing factory comprising:
a plurality of semiconductor manufacturing apparatuses including an exposure apparatus;
20 a local area network for connecting said plurality of semiconductor manufacturing apparatuses;
and

a gateway for allowing access to an external network outside the factory from said local area network and allowing communicating information about at least one of said plurality of semiconductor manufacturing apparatuses,

wherein the exposure apparatus includes a driving unit for moving master and substrate stages or a linear motor for generating a control power for cutting off transmission of a reaction force and/or an external vibration to the exposure apparatus in driving the stages, and

the linear motor has a coil formed by winding a foil-like conductor having an insulating layer in a multilayered structure.

10 37. A maintenance method for an exposure apparatus, comprising the steps of:

preparing a database for accumulating information about maintenance of the exposure apparatus on an external network outside a factory in which the exposure apparatus is installed;

connecting the exposure apparatus to a local area network in the factory; and

maintaining the exposure apparatus on the basis of information accumulated in the database by using the external network and the local area network,

20 wherein the exposure apparatus includes a driving unit for moving master and substrate stages or a linear motor for generating a control power for cutting off transmission of a reaction force and/or an external vibration to the exposure apparatus in driving the stages, and

the linear motor has a coil formed by winding a

foil-like conductor having an insulating layer in a multilayered structure.

38. The apparatus according to claim 1, wherein

the exposure apparatus further comprises a
5 display for displaying maintenance information, a
network interface connected to a computer network to
communicate the maintenance information, and a computer
for executing the communication by network software,
and

10 said display, said network interface, and said
computer enable communicating maintenance information
of the exposure apparatus via a computer network.

39. The apparatus according to claim 38, wherein the
network software provides on said display said user
15 interface for accessing a maintenance database which is
provided by a vendor or user of the exposure apparatus
and connected to the external network outside a factory
in which the exposure apparatus is installed, and
information is obtained from the database via the
20 external network.